REQUEST FOR ADDITIONAL INFORMATION

RELATED TO TOPICAL REPORT ANP-10335P, REVISION 0

"ACE/ATRIUM 11 CRITICAL POWER CORRELATION"

AREVA INC.

(CAC NO. MF5841)

BACKGROUND

Over the course of the review of Topical Report ANP-10335P, Revision 0, the NRC staff became aware of a leaking fuel rod at the Kernkraftwerk Leibstadt (KKL) nuclear power plant in Switzerland, a boiling water reactor/6 (BWR/6) plant operating on yearly cycles. The leaker was believed to have resulted from excessive cladding oxidation due to dryout. Subsequent inspections found widespread occurrences of dryout in locations throughout the core. In the next cycle, steps were taken to increase the minimum critical power ratio operating limit and prevent future instances of dryout. However, further inspections revealed even more dryout indications after the compensatory measures were taken. Additional inspections found that dryout had occurred in several cycles before the leaking fuel rod was identified.

The dryout indications were characterized by visible, wedge-shaped areas of increased oxidation on the fuel rods. The size, shape, and material properties of these areas of increased oxidation indicate that dryout occurred over an extended period of time while the reactor was operating at steady-state conditions, with cladding temperatures remaining below 800°C. Though the shape of the oxidized areas was consistent, the dimensions of the oxidized area and the oxide thickness varied. Dryout is believed to have occurred only when the reactor operated at greater than 95 percent of rated total core flow and was only observed in first-cycle bundles that had been operated with a fuel assembly power greater than 7.4 megawatts. Within these bundles, dryout indications were only found on certain symmetric rod positions and always in the upper part of the bundle.

Dryout of the type observed at the plant was not observed in critical power testing at similar bundle flow rates and powers. At no point during KKL's operation did the analytical methods developed by the fuel's vendor predict that margin to dryout would be sufficiently degraded for dryout to occur. Currently, the underlying mechanisms that caused the dryout at KKL are still unknown.

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Given this operating experience, how does AREVA provide reasonable assurance that adequate critical power margin will be maintained during normal operation, including the effects of anticipated operational occurrences?